

REMARKS

Paragraph 22 on page 5 of the specification has been amended to set forth a generic term for the water pump as used in amended claims 1 and 2 to encompass all the pump variations described in paragraph 22

In the Office Action, claims 1-21 were all rejected. In response, claims 1, 2, 7, 11, 13-15 and 19 are, claims 16, 20 and 21 are canceled, new claims 22-24 are added and claims 3-6, 8-10, 12, 17 and 18 remain in original form. Reconsideration of the remaining rejected claims, as well as the new claims, is respectfully requested.

Referring first to claim 12, the rejection was based on 35 U.S.C. 112, second paragraph, as being indefinite and "unclear and not understood, nor shown in the drawings". The claim recites the application of "heat pipes positioned to transfer excess heat from combustion exposed portions of the cylinder head directly to the coolant in the cylinder head jacket". The application of heat pipes is referred to in the specification in paragraph 12 on page 3 as well as in paragraph 27 on page 6 and the heat pipes are identified in the specification and drawing with reference numerals 44, shown schematically as applied in the cylinder head 18.

Heat pipes are known forms of heat transfer devices which, in some embodiments, utilize evaporation and subsequent condensation of a fluid within a closed pipe and wherein return liquid flow may be assisted by capillary action. It is believed that such devices were classified in the early 1990's in class 165, sub-class 104.26. It is considered that the description of the application of these known devices in the cylinder head of an engine as part of a cooling system is sufficient to render the recitation of claim 12 definite. Reconsideration of the rejection is requested.

Claims 1-11 and 13-21 were rejected on four prior art patent references relied on individually or in various combinations. The applied references are US-3,211,374 Matulaitis, US-4,319,547 Bierling, US-5,828,967 Ueda, and US-4,977,862 Aihara et al. While several of these references show various features of the claimed invention, none show the complete combination of features nor do any of the references disclose all of the features of Applicant's claims. For example, the heat pipes of claim

12 and the variable speed water pump of claims 6, 7, 8 and its function as in claim 19 are not disclosed in the references relied on.

Independent claims 1, 13 and 19 have now been amended for clarity as well as to better distinguish from the prior art.

In claim 1, the water pump is now recited as "a controllable flow water pump ... to pump coolant at variable flow rates through the system". This feature, along with the combined features of the other claim recitations, are neither shown nor suggested in the prior art. The term "controllable flow" is utilized and included in paragraph 22 of the specification to include, not only the preferred electric variable speed drive, but also the alternative controllable flow pump arrangements mentioned in the paragraph which could perform the same or similar functions.

Method claim 13 now recites "a controllable flow water pump" and the controlling step includes "varying as needed the flow of coolant pumped through the system by the pump". The deleted portion of claim 13 is included in new claim 23.

Claim 19 is amended to include the subject matter of canceled claims 20 and 21 in which the use of "an electric variable speed pump for continuing the coolant flow" is recited.

New claim 22 also depends from method claim 13 and calls for "responding to erratic temperature readings in a portion of the engine by increasing coolant flow to the affected engine portion to limit nucleate boiling in the engine. This feature is described in paragraphs 14 and 35 of the specification.

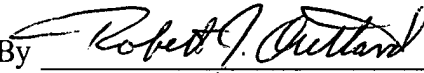
Similarly new claim 24 depends from claim 7 and recites "wherein the controller is responsive to erratic temperature readings in the engine to provide increased cooling at the site of the erratic readings to limit the occurrence of nucleate boiling in the engine".

In view of the forgoing amendments and the novel features recited in the claims as well as the novel combination of both new and known features forming non-obvious combinations recited in the claims, reconsideration and withdrawal of the

rejections and allowance of the claims now present in the application is respectfully requested.

This amendment is believed to be fully responsive to the issues raised in the Office Action and to place this case in condition for allowance. Favorable action is requested.

Respectfully submitted,

By 
Robert J Outland, Attorney
Reg. No. 22,197
(313) 885-1500